UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,866	02/13/2002	Jochen Peters	DE010031	9433

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EXAMINER
SKED, MATTHEW J

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 07/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _04 May 2005_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-9_ is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-9_ is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
     Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   The objection to the specification is withdrawn in view of the amendments filed

5/13/05.

2.   The objection to the claims is withdrawn in view of the amendments filed 5/13/05.

3.   The indicated allowability of claims 1-9 is withdrawn in view of the newly

discovered reference(s). Rejections based on the newly cited reference(s) follow.

Claim Objections

4.   Claims 8 and 9 are objected to because of the following informalities: the

reference to drawing numbers in the claims is improper.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter, which the applicant regards as his invention.

6.   Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite

for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. The claim makes reference to "the maximum-entropy speech

model" in the preamble but there is no prior mention of a maximum entropy speech

model. For the purposes of examination it will be assumed this limitation should state –

a maximum-entropy speech model--.

7.   Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite

for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. The claim makes reference to the variable t_α but does not

define this term in the claim or in the independent claim. For the purposes of

examination it will be assumed that the limitations of claim 4 are incorporated into the

claim.

8.   Where applicant acts as his or her own lexicographer to specifically define a term

of a claim contrary to its ordinary meaning, the written description must clearly redefine

the claim term and set forth the uncommon definition so as to put one reasonably skilled

in the art on notice that the applicant intended to so redefine that claim term. *Process*

Control Corp. v. HydReclaim Corp., 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed.

Cir. 1999). In claims 6 and 7, the claims use the term "orthogonalized" or refers to

specific values as "orthogonal". According to the specification, this intends for the

iteration values of free parameters to be calculated using a linear combination of

desired boundary values of different sets of attributes where one set of the desired

boundary values of attributes has a larger range. However, the accepted meaning for

"orthogonal" refers to vectors that are perpendicular and as such their dot products

would be equal to zero. The values in the claims referred to as orthogonal, however,

are not vectors and therefore cannot be described as orthogonal. The specification fails

to point out how these scalar values exhibit the qualities of orthogonality.

Claim Rejections - 35 USC § 101

9.   Claims 1-7 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

10.   Claims 1-7 are drawn to a mathematical algorithm, per se. Claims to processes

that do nothing more than solve mathematical problems or manipulate abstract ideas or

concepts are non-statutory. If the "acts" of a claimed process manipulate only numbers,

abstract concepts or ideas, or signals representing all of the foregoing, the acts are not

being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d

at 1458-59. Thus, a process consisting solely of mathematical operations without some

claimed practical application is drawn to non-statutory subject matter. In this case, the

claims merely recite the steps of calculating a function, without any practical application

being recited.

Claim Rejections - 35 USC § 103

11.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

12.   Claims 1, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Peters et al. ("Compact Maximum Entropy Language Models").

As per claim 1, Peters teaches a method of calculating iteration values for free parameters in the maximum entropy speech model in accordance with the following general training algorithm:

the (n+1) iteration for the free value of a current attribute of a speech model is a mathematical function of the n-th iteration value of the free parameters, the desired boundary value for alpha and the n-th iteration boundary value for the desired boundary value (equation 5); and

wherein each speech model attribute is assigned to an attribute group and the iteration values are calculated for each and every attribute for the currently assigned attribute group and the adaptation of the iteration values to the respective associated desired boundary values is the worst of all the m attribute groups (calculates the marginals for all the feature groups in order to optimize the method hence performing this calculation on the worst attribute groups, section 4.3).

Peters does not specifically teach or suggest using a predefined criterion to choose the worst attribute groups to update.

However, the Examiner takes Official Notice that choosing to optimize the worst set of data from a larger set of data is notoriously well known in the art. Therefore, it would have been obvious to use a predefined criterion to choose the worst attribute groups to update because it would save processing power and time to update only the boundary values that need to be updated.

13.   As per claim 8, Peters does not teach a speech recognition system comprising a recognition device for recognizing the semantic content of an acoustic signal, in

particular a voice signal, recorded by a microphone and made available, by mapping

parts of this signal onto predefined recognition symbols as supplied by the maximum

entropy speech model MESM, and for generating output signals which represent the

recognized semantic content ; and a training arrangement for adapting the MESM to

recurring statistical patterns in the speech of a specific user of the speech recognition

system, characterized in that the training arrangement calculates free parameters in the

MESM.

However, the Examiner takes Official Notice that using Maximum Entropy models

in speech recognition is well known. Therefore, it would have been obvious to one of

ordinary skill in the art at the time of invention to have a speech recognition system

comprising a recognition device for recognizing the semantic content of an acoustic

signal, in particular a voice signal, recorded by a microphone and made available, by

mapping parts of this signal onto predefined recognition symbols as supplied by the

maximum entropy speech model MESM, and for generating output signals which

represent the recognized semantic content ; and a training arrangement for adapting ·

the MESM to recurring statistical patterns in the speech of a specific user of the speech

recognition system, characterized in that the training arrangement calculates free

parameters in the MESM because it has been successfully applied to natural language

processing hence giving better recognition results.

14. As per claim 9, Peters does not teach a training arrangement for adapting the

maximum entropy speech model (MESM) in a speech recognition system to recurring

statistical patterns in the speech of a specific user of the speech recognition system characterized in that the training arrangement calculates free parameters in the MESM.

However, the Examiner takes Official Notice that continually adapting speech models to a specific user is notoriously well known in the art. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Peters because it would create a specialized model for the current user hence giving better recognition results.

Allowable Subject Matter

15.   Claim 2 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph and U.S.C. 101, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16.   The following is a statement of reasons for the indication of allowable subject matter: Claim 2 recites the combination of calculating the n-th iteration boundary value for the desired boundary value as the sum of the product of the frequency the string of words occurs in the training corpus, the probability the word follows the history and an attribute function and selects the attribute group according the largest value calculated through an equation calculated from the boundary values.

17.   Peters teaches calculating the n-th iteration boundary value for the desired boundary value as the sum of the product of the frequency the string of words occurs in

the training corpus, the probability the word follows the history and an attribute function (equation 4).

Peters does not teach selecting the attribute group according the largest value calculated through an equation calculated from the boundary values and attribute function. It would not have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Peters to arrive at the applicant's invention.

18.   Claims 3-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

19.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kneser et al. ("Semantic Clustering for Adaptive Language Modeling") teaches clustering attributes in a vocabulary into classes in an adaptive language model. Berger et al. ("A Maximum Entropy Approach to Natural Language Processing"), Mikheev ("Feature Lattices for Maximum Entropy Modeling"), and Greiff et al. ("The Maximum Entropy Approach and Probabilistic IR Models) teach alternate methods for calculating the iteration values for free parameters in a maximum-entropy model.
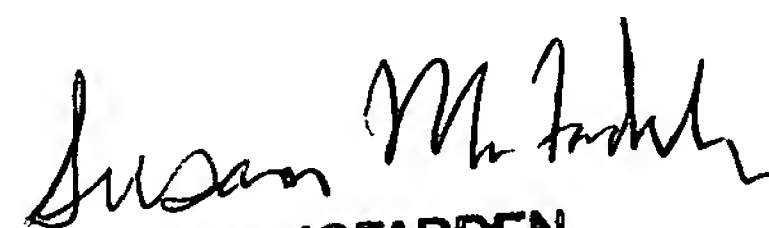
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Sked whose telephone number is (571) 272-7627. The examiner can normally be reached on Mon-Fri (8:00 am - 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

MS
07/11/05

SUSAN MCFADDEN
PRIMARY EXAMINER